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Lichenochora tertia (*Phyllachorales*): the third species of the genus growing on *Xanthoria elegans*

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Abstract — *Lichenochora tertia* is a new lichenicolous fungus described from Peruvian Andes. The species is characterized by small perithecia deeply immersed in the thallus of *Xanthoria elegans* and small, narrowly ellipsoidal ascospores with subtle torus along the septum; the fungus does not induce gall formation.

Key words — Neotropics, South America, biodiversity, taxonomy

Introduction

During the study of the lichenicolous biota of Bolivia (Flakus & Kukwa 2012a,b, Kukwa et al. 2012) we examined an infected specimen of *Xanthoria elegans* collected by the fourth author in Peru, which was found to host an undescribed *Lichenochora*. The lichenicolous biota of Peru is still very poorly studied, and the only paper fully dedicated to this subject was published by Etayo (2010). Therefore, it is not surprising that a new taxon was discovered in a biologically rich Andean ecosystem.

The lichenicolous genus *Lichenochora* Hafellner (*Phyllachorales*) comprises 34 species worldwide, of which ten parasitize members of the family *Teloschistaceae*. Two of them are known to grow on *Xanthoria elegans* (Link) Th. Fr. (Triebel et al. 1991, Navarro-Rosinés & Etayo 2001, Etayo & Navarro-Rosinés 2008, Hafellner et al. 2008, Lawrey & Diederich 2011).

Material & methods

The morphology and the anatomy were examined by using a NIKON SMZ800 and a NIKON ECLIPSE 80i (DIC) microscopes. The anatomy was studied in water, KOH solution (K) and, for the ascus structure, in Lugol's iodine solution without (I) or with pre-treatment with KOH (K/I). The measurements were made in tap water. Ascospores measurements are presented as: arithmetic mean – standard deviation, arithmetic mean, and arithmetic mean + standard deviation, flanked by the minimal and maximal measurements in parentheses, and the length/breadth ratio (l/b) is presented in the same way, followed by the number of measurements (n). Values in italics (e.g., *–3.2–*) are arithmetic means. The holotype is conserved in Herbario Nacional de Bolivia, Universidad Mayor de San Andrés, La Paz (LPB).

Results

Lichenochora tertia Etayo, Flakus & Rodr. Flakus, **sp. nov.** PLATE 1

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Differs from *Lichenochora sinapispermae* by its smaller perithecia, deeply immersed in the host thallus and not forming galls, and by its more narrowly ellipsoidal ascospores.

Type — Peru: Dep. Cusco, Prov. Canchis, Cordillera de Vilcanota, cerca del Nevado Japu Punta, vegetación altoandina con suelo muy pedregoso con rocas de gran tamaño y poca cobertura de plantas superiores, 5320 m, 13°45′41.4″S 71°04′58.8″W, en *Xanthoria elegans* en piedra silícea, 13 March 2008, P. Rodriguez Flakus 498b (**Holotype**, LPB).

Etymology — *tertius* (Lat.), referring to this being the third species of the genus *Lichenochora* found on *Xanthoria elegans*.

Fungus parasymbiotic, not inducing gall formation. Mycelium hyaline, inconspicuous, observed only at the base of the perithecia. Ascomata perithecia dispersed or aggregated in small groups, 120–190 µm in diam. and up to 200 µm high, pyriform, strongly rough near apical part, immersed in 2/3 with only the upper part erumpent outside of host thallus; forming papillae. Exciple dark reddish-brown (K+ olive-brown), 20–40 µm wide, formed by several layers of polygonal cells, usually with many oil guttules in internal cells, of dark brown thick-walled cells, 8–15 µm in diam., with some cells protruding to the outside giving it a verrucose appearance; innermost excipular layer of pale brown to hyaline thin walled cells, 6–15 × 2–10 µm. Papillae of elongate cells formed mainly in the upper part of perithecium (near ostiole), usually grouped and forming wide appendages up to 20–35 um long. Hymenium inspersed by oil droplets, 1–8 µm in diam., large droplets (5–8 µm in diam.) abundant and obscuring the hymenium. Paraphyses rare in mature ascomata and obscured by oil droplets, 3–8 µm wide, with thin-walled cells. Asci (2–)6–8-spored, 60–90 × 11–15 µm, clavate, functionally unitunicate, K/I–, with stalk up to 5 µm long, thin-walled, not thickened in the apex. Ascospores narrowly ellipsoidal, sometimes slightly curved, with obtuse to slightly tapering ends, smooth-walled, (0–)1-septate, colourless, without perispore, formed

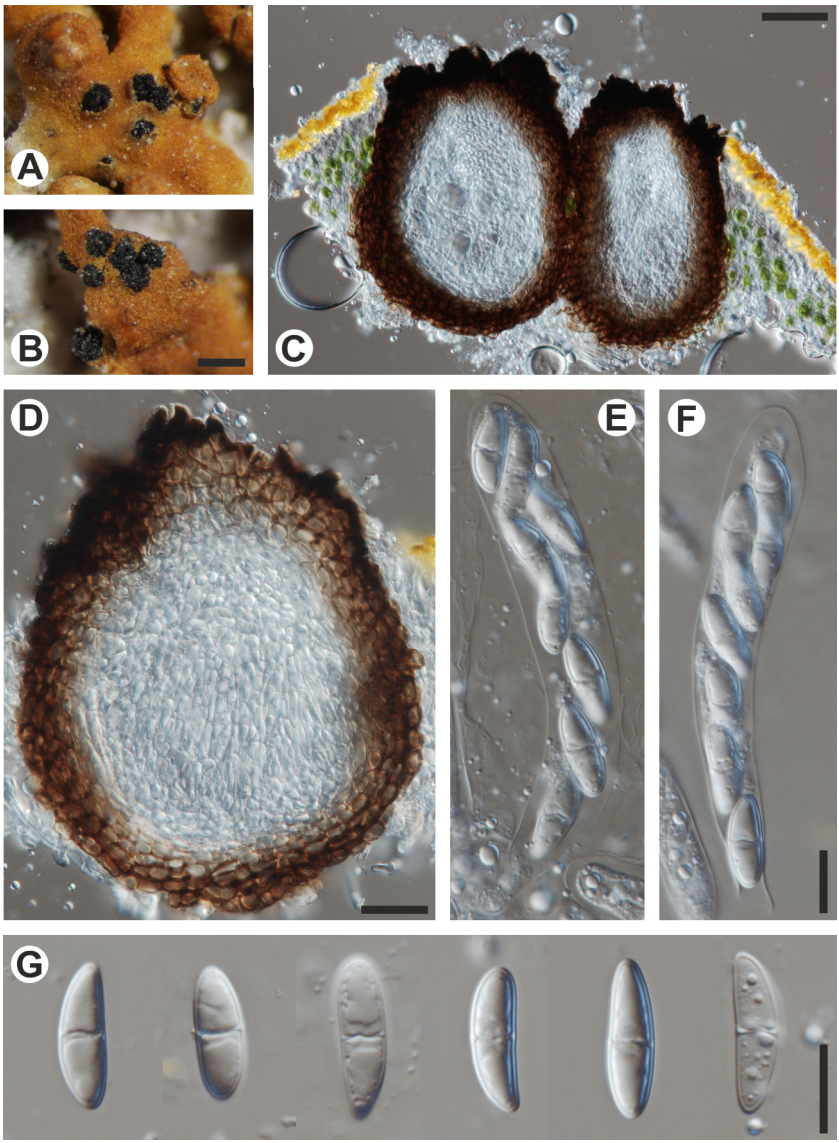

Plate 1. *Lichenochora tertia* (holotype). A, B: habit of perithecia with rugose surface of *Xanthoria elegans*; C: section through two perithecia immersed in host thallus and forming wide erumpent appendages in upper part; D: section of perithecium showing structure of excipulum; E, F: asci with ascospores inside; G: ascospores. Scale bars: A, B = 200 µm; C = 50 µm; D = 25 µm; E–G = 10 µm.

subtle torus along the septum, and usually with one large oil guttule in each cell (sometimes splitting up into several small ones), walls c. 0.5 µm thick, (12–)15–*16.5*–18(–20) × (4–)4.9–*5.3*–5.7(–6.5) µm, l/b = (2.2–)2.8–*3.2*–3.6 (–4.5) (n = 120).

Distribution and habitat — The new species is known only from the type locality in Peruvian Andes, where it was found on epilithic *Xanthoria elegans* in high montane conditions.

Comments — *Lichenochora tertia* is characterized by its small perithecia, small, narrowly ellipsoidal ascospores with a subtle torus along the septa, and not gall-forming. The most similar species is *L. sinapispermae* Etayo & Nav.-Ros. due to its ascospore size and the presence of the torus, but it has comparatively wider ascospores, (5.5–)6–*6.9*–8(–8.5) µm, which are broadly ellipsoidal, with l/b ratio (1.6–)1.9–*2.2*–2.5(–2.8), comparatively bigger perithecia, 200–250 µm in diam. (230–300 µm high), and also shorter papillae, 8–13 µm long (Navarro-Rosinés & Etayo 2001). Moreover, the perithecia are at first half-immersed, but soon almost sessile on the thallus of *Caloplaca sinapisperma* (Lam.) Maheu & A. Gillet.

According to Hafellner et al. (2008) and Etayo & Navarro-Rosinés (2008) two *Lichenochora* species are known to inhabit *Xanthoria elegans*, *L. elegantis* Hafellner and *L. xanthoriae* Triebel & Rambold. *Lichenochora elegantis* has longer ascospores, 28–33 µm long, 4-spored asci and much bigger perithecia, 300–400 µm in diam. (Hafellner et al. 2008), whereas in *L. xanthoriae* ascospores are considerably wider, 8–9(–9.5) µm wide, and the species induces the formation of small cecidia (Triebel et al. 1991).

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